

REMARKS

Claims 1 and 2 are pending in the application. Claim 1 has been amended. No new matter has been added. It is respectfully submitted that this Response is fully responsive to the Office Action dated April 24, 2009.

Claim Rejections - 35 U.S.C. §112, Second Paragraph:

Claims 1 and 2 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicants regard as the invention.

This rejection is respectfully traversed.

It is respectfully submitted that claim 1 has been amended to over this rejection. Accordingly, withdrawal of this rejection is respectfully requested.

As to the Merits:

As to the merits of this case, the Examiner sets forth the following rejection:

claims 1 and 2 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Takeuchi et al. (USP 5,007,747). This rejection is respectfully traversed.

While the Examiner clearly acknowledges that Takeuchi fails to disclose a total crowning amount being 50 μm or more, the crowning ratio of the outer ring being 40% or more, the roller

crowning ratio being 20% or less, and the inner wheel crowning ratio being 10% or more, the

Examiner asserts that:

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Takeuchi et al. such that the total crowning amount is 50 μm or more, the crowning ratio of the outer ring is 40% or more, the roller crowning ratio is 20% or less, and the inner wheel crowning ratio is 10% or more, since it has been held that discovering optimum value or a result effective variable involves only routine skill in the art.

That is, the Examiner correctly acknowledges that Takeuchi fails to disclose or fairly suggest the features of claim 1 concerning *wherein the total crowning amount, defined as crowning amount of outer ring + crowning amount of inner ring + crowning amount of roller, is 50 μm or more, and the crowning ratio of the outer ring, defined as crowning amount of outer ring/total crowning amount, is 40% or more, and the roller crowning ratio, defined as roller crowning amount \times 2/total crowning amount, is 20% or less.*

It is respectfully submitted that Takeuchi teaches away from having the total crowning amount be 50 μm or more. For example, for bearings A-D, as shown in Fig. 3 of Takeuchi, having sum Δt of 20 μm , 4 μm , 40 μm and 20 μm , respectively, bearing A needs less torque than bearing D, which needs less torque than bearing C, which needs less torque than bearing B.

That is, the data provided in Fig. 3 of Takeuchi clearly teaches that having the sum Δt being equal to 20 μm in bearing A and D reduces the need for torque. Moreover, bearing C, which has a sum Δt of 40 μm , requires substantially more torque than bearings A and D. As

such, it is submitted that Takeuchi teaches away from using a bearing, i.e., bearing C, having a total crowning amount greater than 50 μ m.

Further, for bearing A, the depth of crowning ϕt_2 of the outer ring 1 and the depth of crowning ϕt_3 of the inner ring 5 were set to 15 μ m. The sum Δt of the depths of crowning is set to 20 μ m. As such, Takeuchi's outer ring crowning ratio is 37% (15 μ m/40 μ m), which is less than the 40% or more required by claim 1. Additionally, the roller crowning ratio in Takeuchi for bearing A is 25% (10 μ m/40 μ m), which is more than the 20% or less required in claim 1.

As such, it is respectfully submitted that Takeuchi explicitly teaches away from having the crowning ratio of the outer ring being 40% or more and the roller crowning ratio being 20% or less, as required in claim 1.

Moreover, there is an EXCEPTION to the rule that discovery of optimum value of variable in known process is normally obvious occurs when parameter optimized was not recognized to be result effective value. In other words, a particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977).

That is, the Examiner has failed to establish based on the teachings of Takeuchi that the total crowning amount, the crowning ratio of the outer ring and the roller crowning ratio, as defined by claim 1, are particular parameters that are recognized as result-effective variables.

In other words, Takeuchi is simply not concerned with determining the optimum total crowning amount, the crowning ratio of the outer ring and the roller crowning ratio, as defined by claim 1. Instead, in Takeuchi, the amount of crowning which is defined as $\Delta t/l$ is set to 0.0007 to 0.002 (mm/mm), wherein Δt is the sum of the depths of crowning of the axial ends of the raceway surfaces 7 and 8 and l is the effective length of each tapered roller 3. Further, the inner surface 9 of the rib 4 of the inner ring 5 is concave and has a radius of curvature R_1 which is preferably 2 to 10 times as large as the radius of curvature R of the larger end face 2 of each tapered roller 3. Thus, Takeuchi merely recognizes the amount of crowning which is defined as $\Delta t/l$ and the design of the rib 4 as result-effect variables and fails to recognize the total crowning amount, the crowning ratio of the outer ring and the roller crowning ratio as result-effect variables.

Accordingly, the Examiner has failed to establish a *prima facie* case of obviousness.

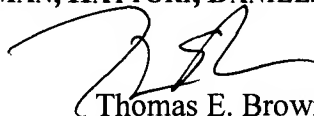
In view of the aforementioned amendments and accompanying remarks, Applicants submit that the claims, as herein amended, are in condition for allowance. Applicants request such action at an early date.

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney to arrange for an interview to expedite the disposition of this case.

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

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